

Table 2
Antenna Height-Power Reduction

Antenna Height Above Average Terrain in meters (feet)	Effective Radiated Power (ERP) (watts)
Above 1372 (4500)	65
Above 1220 (4000) to 1372 (4500)	70
Above 1067 (3500) to 1220 (4000)	75
Above 915 (3000) to 1067 (3500)	100
Above 762 (2500) to 915 (3000)	140
Above 610 (2000) to 762 (2500)	200
Above 457 (1500) to 610 (2000)	350
Above 305 (1000) to 457 (1500)	600
305 (1000) and below	1000

We note that these are the maximum allowable values based on a reliable service area of 32 kilometers (20 miles), consistent with current regulations for 900 MHz paging.⁹¹ Where a 32 km (20 mile) service area is either unnecessary or not possible, we propose that base station ERP and antenna height be limited in accordance with Section 90.635(c), Table 4.⁹² If these proposals prove too restrictive for implementing certain types of 900 MHz PCS systems, for example, in the case of co-channel stations operating in the vicinity of regional boundaries, when high power operations must co-exist with low power operations, we propose that the affected parties be allowed to negotiate alternative operating limits and agreements.

126. We propose that portable and mobile units be limited to a maximum ERP of 7 watts, as suggested by Mobile Telecommunication

⁹¹See Section 22.504(b) (2). Base stations that would be subject to our proposed antenna height-power reduction table correspond to a Class L 931 MHz paging base station under Section 22.502(c) of the Commission's rules. In accordance with Section 22.504(b) (2) this station class is afforded a reliable service radius of 32 km (20 miles) and an interference radius of 80 km (50 miles). This equates to a co-channel base station separation of 112 km (70 miles).

⁹²See 47 C.F.R. Part 90.635(c). The table in that section prescribes radiated power and antenna height limits for base stations that do not, or cannot (as might be the case in certain 900 MHz PCS operations), have a requirement for a reliable service area of 32 km (20 miles).

Technologies Corporation (Mtel).⁹³ We believe this will be sufficient to accommodate both portable and mobile units. We also propose to require that portable and mobile units use the minimum output power necessary for successful communication. This proposal should result in mobiles with sufficient power to accomplish their intended function, while limiting potential interference among services and users. We request comment on alternate mobile unit power limits (e.g., should different limits apply to mobiles used in different applications?) and on whether the Commission should mandate methods for limiting mobile unit ERP to the minimum necessary.

127. 900 MHz Out-of-Band Emissions. We propose to adopt emission limitations, or masks, that limit out-of-band emissions and, therefore, potential interference to adjacent channel PCS systems and to services operating in other frequency bands. Thus we propose that 900 MHz PCS systems be subject to emission limits identical to those of existing Section 22.106(b)(4) of the Commission's rules.⁹⁴ We also propose that all 900 MHz PCS operations be subject to provisions identical to Section 22.106(c) of the rules.⁹⁵ We note that these proposals are based on rules that apply to paging-type operations that employ digital modulation and bandwidths greater than 12.5 kHz.

128. We make these proposals based on the descriptions of future systems, many of which transmit digital information, provided in some of the 900 MHz petitions. However, we invite comment on this and alternative proposals. Commenters should address appropriate limits for the different types of 900 MHz operations; for example, high-powered nationwide services versus low-power micro-cellular services, and differing modulation schemes and channel bandwidths. We will not propose emission designator types at this early stage in the development of 900 MHz systems. We do, however, request comment on this aspect of 900 MHz PCS technical regulation.

129. We tentatively conclude that these minimal 900 MHz technical regulations will protect adequately existing 900 MHz services, limit interference among new 900 MHz PCS services and provide flexibility in designing and implementing these new services. We request comment on and technical analysis of our proposals and invite alternative proposals that might be appropriate for 900 MHz PCS. Commenters should take into consideration whether the service would be nationwide or regional,

⁹³See Mtel's petition at 23.

⁹⁴See also Section 99.411(a) of the attached Proposed Rules.

⁹⁵See 47 C.F.R. § 22.106. See also Section 99.411(b) of the attached Proposed Rules.

the type of service offering and method of communications (e.g., simulcast, microcellular) and the degree to which co-channel, adjacent channel or adjacent band services must be protected. Comment also is sought on our proposal to allow negotiation among existing and potential users when implementing new PCS systems.

Interoperability and Roaming

130. As discussed above, large regional and nationwide licenses and the intrasystem interoperability likely to result will facilitate regional and nationwide roaming. The licensing plan for PCS may enable national, regional, or local licensed operators to provide service in the same geographical areas. This presents a unique opportunity for each service provider as PCS services continue to evolve. It would be premature to propose that licensees provide certain basic PCS services. Further, there are several technologies and protocols available to deliver PCS services, and more are being developed. The licensee should have the flexibility to determine which PCS services are the most needed and to provide those services by the most advantageous technology. To require intersystem interoperability at this time may impede the deployment of this new service. Therefore, we are tentatively proposing not to require intersystem operability among different licensees. We invite comment of the issues of intersystem and intrasystem operability and roaming.

RF Hazards

131. We note that concern has been expressed over the potential of PCN/PCS devices to create radio frequency (RF) fields that may be harmful to human health.⁹⁶ Although the power levels likely to be used by most of these devices should be relatively low, in some cases (handsets, indoor base stations) their emissions can be in close proximity to users and non-users. Since 1985, the Commission has used the RF exposure guidelines of the American National Standards Institute (ANSI) for evaluating environmental exposure to RF fields.⁹⁷ The 1982 ANSI guidelines originally adopted by the Commission are being revised and will

⁹⁶For example, see T.S. Rappaport, "The Wireless Revolution," IEEE Communications Magazine, p. 70, November 1991. Also, see Comments and Reply Comments of Memorex Telex Corporation on the Apple Petition, RM-7618, dated April 10 and May 10, 1991, respectively.

⁹⁷See 47 C.F.R. § 1.1307(b).

likely be considered for future use by the FCC along with other available exposure criteria.⁹⁸

132. We invite comment on the likelihood of PCN/PCS devices not complying with RF exposure guidelines that may be applicable to them.⁹⁹ We also request interested parties to submit for the record documentation of any research performed that is relevant to this issue. An example of such research would be studies of dosimetry to the human head involving PCN handsets. Other questions that have been raised are whether a digital signal may biologically be more hazardous than an analog signal at relatively low levels of exposure and whether the frequencies proposed for PCN/PCS may be more hazardous than others. Also, are there suggested maximum levels for handsets above which excessive RF exposure might occur? Is the FCC the appropriate agency to establish such limits, or are there other agencies of the Federal Government that should take a lead role in developing such guidelines? For example, under the terms of the Radiation Control for Health and Safety Act of 1968, the U.S. Food and Drug Administration has jurisdiction to establish performance standards to control radiation from electronic products.¹⁰⁰

International Issues

133. On the international level, other countries currently are developing mobile personal communications systems under a variety of names. The common factor among these systems is a communications service that will transmit and receive voice, data, and video information using a small personal device accessible by means of a unique number to and from any location. As a practical matter, the ability to achieve personal mobile communications will entail an array of services and service providers and networks

⁹⁸See IEEE C95.1-1991 (Revision of ANSI C95.1-1982), IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz (approved September 26, 1991). Copies available from: Institute of Electrical and Electronics Engineers, Inc. (IEEE), Standards Department, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, 1-800-678-IEEE.

⁹⁹We note the IEEE C95.1-1991 standard could reduce the maximum acceptable power for portables. We solicit specific comments on this issue.

¹⁰⁰See 21 C.F.R. Part 1010 - Performance Standards for Electronic Products; and Radiation Control for Health and Safety Act of 1968, 42 U.S.C. § 263f.

which, ideally, should be transparent to the user.¹⁰¹ The communications networks of the future will be an amalgamation of existing and developing technologies consisting of radio-based, wire, and fiber delivering information in a digital format to a global clientele.

134. As discussed above, the recent World Administrative Radio Conference addressed 2 GHz spectrum allocations for the next generation of mobile communications. At the Conference the U.S. took the position that the current Region 2 allocation is sufficiently flexible to accommodate projected PCS requirements without making a separate exclusive allocation. The clear trend in the rest of the world, however, is to set aside a defined frequency band for exclusive use of PCS type services, such as the European proposals for FPLMTS. This trend toward an exclusive worldwide allocation was fueled by the recommendation of the ITU's radio technical committee, the CCIR, to set aside 230 MHz in the 1-3 GHz band around the world for FPLMTS starting in 1988.¹⁰² The contentiousness of this issue at the WARC illustrates the importance of the next generation of mobile services and the level of developmental activity.

135. Europe and Japan have identified PCS-type services as regional and national priorities. The European Community is working actively in the CCIR and CCITT to promote standards to enable regional implementation of FPLMTS and has proposed specific allocations for PCN services.¹⁰³ The U.K. already has begun implementing advanced mobile communications such as Telepoint, with mixed success. Nevertheless, the potential PCS market in the U.K. is projected to reach 4 million subscribers by the turn of the century. Although this revised projection is substantially lower than previous forecasts, business interest remains strong and technical development is continuing rapidly. The U.K. is

¹⁰¹We do not intend our proposal to preclude future offerings of satellite-based PCS. We invite comment on the prospect for future satellite-based offerings for both domestic and international services, and how such offerings may be integrated into the technical and regulatory rules proposed in this proceeding. See note 15, supra.

¹⁰²Of this amount, 167 MHz would be assigned to communications with mobile stations (in vehicles such as cars and trains); 60 MHz would be reserved for stationary or slow-moving stations (pocket-sized portable units).

¹⁰³The EC has proposed the following: DECT at 1800-1900 MHz (Pan European allocation); UMTS at 1900-2200 MHz (WARC-92 proposal); and FPLMTS at 1900-2200 MHz (WARC-92 proposal).

strongly supporting the concept of FPLMTS and has proposed spectrum for national implementation.¹⁰⁴

136. France is conducting a "public inquiry" into the introduction of personal communications services.¹⁰⁵ The French inquiry notice states that research for PCN is being conducted "within the framework of the European RACE¹⁰⁶ programme and by ETSI and CCIR." France has identified the following frequencies as "available" for personal communications services: 1880 MHz and 1900 MHz¹⁰⁷ (for systems using the DECT¹⁰⁸ standard) and 864 MHz and 868 MHz (for systems using the CT2-CAI¹⁰⁹ standard). The public notice document states that, "In addition [to the foregoing frequencies], depending upon market requirements, DRG may, if necessary...authorize the use of frequencies around 1800 MHz in urban areas, for systems using the DCS 1800 standard¹¹⁰, currently being defined at ETSI."

¹⁰⁴The United Kingdom has proposed the following for advanced mobile services: 864-868 MHz for CT-2; and 1710-1880 for PCN (1710-1785 paired with 1805-1880 MHz).

¹⁰⁵On January 28, 1992, Mr. Bruno Lasserre, Director General of the Regulatory Affairs (DRG), under the French Ministry of Posts and Telecommunications, announced that the DRG had opened what was termed a "broad public consultation" into PCN. The Foreword to the public notice document noted that such a public inquiry process is "an innovation in France."

¹⁰⁶"RACE" is the acronym for Research into Advanced Communications in Europe. It is a telecommunications research program administered by the European Community.

¹⁰⁷The frequencies are quoted as reported in the public notice document to highlight the lack of specificity.

¹⁰⁸DECT is the acronym for Digital European Cordless Telephone, the standard for which is currently being defined in ETSI. In addition to the services offered by CT-2, DECT provides data transmission and ISDN connection in a high density traffic environment.

¹⁰⁹CT2-CAI stands for Cordless Telephone 2 - Common Air Interface (standardized at ETSI under I-ETS No. 300-131). The same CT-2 terminals are designed to be used for residential cordless telephone, wireless PBX, and for public access to the PSTN.

¹¹⁰DCS 1800 is an extension of GSM (Global System for Mobile Communications) the pan-European digital standard for cellular radiocommunications. The cells for DCS 1800 are smaller than those for GSM due to different propagation characteristics.

137. Japan is actively pursuing development of PCS technologies as part of its national industrial policy. Internationally, Japan has expressed support for the CCIR FPLMTS recommendations on bandwidth, location, and exclusivity. Domestically, the Japanese Ministry of Posts and Telecommunications plans to submit inquiries on PCS technical requirements and other relevant issues for deliberation by the Telecommunications Council, an advisory organ to the MPT, and to take action on standardization issues based on the resulting reports. Japan has already proposed tentative allocations for PCN services.¹¹¹

138. In Canada, the 944-948 MHz band has been allocated for use by all components of digital cordless telephone service, including public access and residential and business systems. An additional band, 948-952 MHz, is identified for expansion if services demand requires more frequencies. Implementation of these services is expected to commence in 1993.

139. The introduction of PCS into the global communications market touches upon many of the most complex and high profile regulatory and technical issues now facing the international communications community. Using a personal and portable device to achieve instantaneous communications with another person, as opposed to connection to a particular station, has been defined as the primary goal of many national and international fora. Although this Notice of Proposed Rule Making addresses domestic implementation, establishment of world-wide PCS, *i.e.*, fully-developed personal mobile communications, will require on-going multi-national coordination of, *inter alia*, spectrum allocation, technical standards, and regulatory treatment of the panoply of services that this Commission has defined as PCS. In light of this global situation we tentatively conclude that the Commission should act expeditiously to license U.S. PCS providers because unnecessary delay could threaten the U.S. leadership role in communications technology.

IV. PIONEER'S PREFERENCE

140. The Commission's pioneer's preference rules were promulgated last year to provide preferential treatment in its licensing processes for parties that develop new communications services and technologies. Our intent was to foster the development of new services and improve existing services by

¹¹¹Japan has proposed the following for PCN services: 280 MHz and 380 MHz for Advanced Cordless Business Phone; 1465-1477 and 1513-1525 MHz for MCA (private multi-channel land mobile system); 1429-1525 MHz for Digital Cellular; and 1535-2655 MHz for Next Generation Portable Telephone.

reducing the delays and risks for innovators associated with the Commission's licensing processes. We believed that in this manner true innovators of substantial new communications services and technologies would have an opportunity to participate either in the new services that they took a lead in developing or in existing services with regard to which they took a lead in promoting application of new technologies.¹¹²

141. The requests submitted in GEN Docket No. 90-314 and ET Docket No. 92-100 are evidence that the pioneer's preference rules have sparked substantial interest on the part of a wide variety of parties, and that a considerable number have conducted substantial experimentation and collectively accomplished significant innovation that relates to PCS. We believe that such results will lead to implementation of significant new services and technologies that will enhance U.S. productivity and competitiveness.

142. The majority of pioneer's preference requests -- 57 -- were filed in GEN Docket No. 90-314. Fifty-one of these requests propose services envisaged to be provided using 2 GHz or higher spectrum, and six addressed exclusively narrowband services, such as CT-2 and limited data messaging, that could be provided in the 900 MHz spectrum range. There also are 13 pioneer's preference requests filed in ET Docket No. 92-100, all of which address narrowband services that could be provided in the 900 MHz range.

143. We have concluded that it would be inappropriate to make tentative decisions at this time on the 57 requests filed in GEN Docket No. 90-314. Although Section 1.402 of our Rules specifies that such decisions are to be made when a Notice of Proposed Rulemaking is issued in a proceeding, in this instance we find good cause not to do so due to the uncertainty and contingent nature of our 2 GHz proposals in this docket. As discussed above, the PCS proposals made herein are entirely contingent upon the outcome of the proceeding to allocate spectrum for emerging technologies, ET Docket No. 92-9.

144. Accordingly, we believe it appropriate to issue tentative decisions on pioneer's preference requests that address 2 GHz services only after we issue a Report and Order in the emerging technologies proceeding. In order to avoid unnecessary confusion, we also are deferring judgment until the Report and Order in the emerging technologies proceeding on the six pioneer's preference requests in GEN Docket No. 90-314 that address

¹¹²The pioneer's preference regulations are codified at 47 C.F.R. §§ 1.402, 1.403, 5.207. See Establishment of Procedures to Provide a Preference, Report and Order, 6 FCC Rcd 3488 (1991), recon. granted in part, 7 FCC Rcd 1808 (1992), further recon. pending.

frequencies below 1 GHz. These requests will not be foreclosed by our consideration herein of the 900 MHz pioneer's preference requests in ET Docket No. 92-100 because no licenses for use of that spectrum will be issued until the pioneer's preference requests in GEN Docket No. 90-314 are tentatively decided.

145. Parties are reminded that all of the PCS pioneer's preference requests have been opposed formally, and therefore that the pioneer's preference portion of both dockets are restricted under the Commission's ex parte rules. Comment on our tentative decision should be made in pleadings filed separately from comment on our rulemaking proposals, and be clearly marked ET Docket No. 92-100, with the appropriate PP number(s) on the first page of the filing.

Pioneer's Preference Standards

146. The rationale for granting a pioneer's preference is that the requester is responsible for one or more significant innovations that relate to communications technology and service and has invested significant effort in developing the innovation and pursuing authorization of its implementation. We reiterate that we do not intend to grant pioneer's preference requests casually, but rather, require each requester to persuade us that its proposal is innovative, has merit, and that the requester is the original developer and proponent of the innovation at issue.

147. Accordingly, in the case of each request before us, we must determine (1) whether the requester has demonstrated that its proposal constitutes a significant communications innovation; (2) whether the requester is the party responsible for the claimed innovation; (3) whether it has made a significant contribution in developing that innovation; and (4) whether the innovation reasonably will lead to establishment of a service not currently provided or substantially enhance an existing service. In making these determinations, we apply the pioneer's preference standards set out in our rules and previously applied in our Tentative Decision to award a pioneer's preference to Volunteers in Technical Assistance (VITA).¹¹³ We consider whether a proposal is "to provide either a service not currently provided or a substantial enhancement to an existing service"¹¹⁴ by evaluating factors that include, but are not limited to, (1) added functionality; (2) new use of spectrum; (3) changed operating or technical characteristics; (4) increased spectrum efficiency; (5)

¹¹³See Allocate Spectrum for Fixed and Mobile Satellite Services for Low-Earth Orbit Satellites, Tentative Decision, 7 FCC Rcd 1625 (1992).

¹¹⁴See Report and Order, *supra* note 112 at para. 49.

increased speed or quality of information transfer; (6) technical feasibility; and (7) reduced cost to the public. In addition, to be eligible for a tentative award, at the time of the related Notice a requester must have obtained an experimental license, commenced its experiment, and reported at least preliminary findings to the Commission that tend to confirm the technical feasibility of its proposal; or alternatively, a requester must have submitted a written showing that demonstrates the technical feasibility of its proposal.¹¹⁵

148. Our rules also require that a preference be granted only if the rules that are adopted for application to the new technology or service are a reasonable outgrowth of the proposal and lend themselves to grant of a preference. At the Notice stage we consider our proposed rules to be the rules against which a preference request is measured.

Tentative Decision

Mtel Request Tentatively Granted

149. We have reviewed the 13 requests for pioneer's preference filed in ET Docket No. 92-100, and tentatively conclude that Mobile Telecommunication Technologies Corporation (Mtel), PP-37, merits a preference for its having developed and demonstrated significantly improved bit transmission rates, submitted an innovative proposal based upon these improved rates that will result in new service functionalities being available to consumers, and developed the technology necessary to implement its proposal. Mtel has developed and preliminarily demonstrated what it has named "Multi-Carrier Modulation" (MCM) technology that is capable of transmitting 24 kilobits per second simulcast in a single 50 kHz channel. This development represents a bit rate that is ten times that of existing state-of-the-art simulcast paging systems using an equivalent bandwidth and facilitates providing a new type of service to the public. This improved bit rate capacity provides the foundation for Mtel's proposal to provide a wireless network offering a broad range of two-way data communications services, acknowledgment paging, encryption, error correction, and general determination of subscriber location.

150. Paging Network, Inc. and PageMart, Inc. both argue that Mtel's proposed service is not superior to existing services because Mtel's 24 kilobit transmission speed does not result in delivering messages more rapidly than other current paging services. PageMart also claims that Mtel's frequency reuse plan is inferior because its transmitter's coverage area often includes an entire city, which limits the number of consumers that can be

¹¹⁵Recon., supra note 111 at 1809.

served by the system. Mtel responds that its field tests confirm the system's ability to deliver the messages in a timely manner; and that a nationwide survey conducted for it by Arthur D. Little confirms Mtel's expected average expected message length. Based upon the message length figure, Mtel states that it and two competitors, each with just 50 kHz nationwide, could more than completely serve the maximum predicted customer base of 1,600,000 subscribers five years after introduction. We find Mtel's argument persuasive, and tentatively conclude that the technology it has developed and the service it proposes merit a pioneer's preference.

151. Mtel proposes to provide these services on a nationwide basis and requests a nationwide preference. We note that we indicated our general intention to not grant a nationwide pioneer's preference in both our Report and Order and Reconsideration Order on the pioneer's preference rules, due to an underlying concern that competition be fostered. In this particular instance, however, grant of a nationwide preference may be consistent with our underlying goal of promoting competition if our allocation and assignment rules provide multiple nationwide licenses in the 900 MHz band, supra. Given that our alternatives include nationwide competition within this spectrum, we tentatively conclude that if the tentative preference is confirmed and multiple nationwide bands assigned, Mtel would be the only eligible applicant for one of the nationwide licenses for unpaired spectrum in the 930-931 MHz range. If our rules do not provide for competitive unpaired nationwide channels, Mtel would be the only eligible applicant for one of the regional licenses.

Requests Tentatively Denied

152. PageMart, Inc., PP-40, proposes a two-way "personal information messaging service" (PIMS) that it states would permit users to send or receive text or graphics of any length, in any format, to and from a variety of portable or stationary devices such as pagers and "palmtop" computers. PageMart's system would use a cellular-like transmission network to simulcast a page; the paged handheld unit would signal back its location; and then the system would assign a single transmitter for communications that would include digitized voice and data. In its preference request PageMart acknowledges that its experimental program is designed to demonstrate the technical feasibility of its proposal and states that its testing "will enable it to confirm to the Commission the feasibility of the PIMS design prior to the time the Commission would be required to act on PageMart's preference request."¹¹⁶ We now are at the point of acting on its request, but PageMart has not submitted even preliminary results of its tests. Such results might have clarified the technological differences, if any,

¹¹⁶PageMart Request for Pioneer's Preference at i, 13.

between PageMart's scheme and existing cellular systems. In any event, inasmuch as PageMart itself explicitly relies upon only its experimental results to confirm the technological feasibility of its proposal, and it has not submitted such results, we tentatively conclude that its request should be denied.

153. The proposal of Paging Network, Inc., PP-84, principally addresses voice paging services using two 25 kHz channels for signalling and eight 25 kHz channels for message transmission, but provision of text, data, facsimile and acknowledgment services also are encompassed. While its proposal discusses the efficiencies expected from using a cellular configuration and the already-developed ERMES signalling protocol, Paging Network does not clearly demonstrate what part of its system is new or innovative and which it uniquely developed. We note that in this docket others have similarly proposed acknowledgment or tracking in conjunction with paging, and such features also are included in cellular configurations of transmitters and receivers to attain increased frequency efficiency. Accordingly, we tentatively conclude that Paging Network has failed to meet its burden of demonstrating that its proposal is new or innovative, and therefore its request should be denied.

154. Freeman Engineering Associates, Inc., PP-79, submitted a general proposal to provide a number of paging-type services using "advanced modulation techniques" and "some current technology and some technology yet to be applied."¹¹⁷ Freeman does not explain the technical basis for its proposal with greater specificity. Accordingly, we tentatively conclude that Freeman has failed to meet its burden of demonstrating that its proposal is new, innovative, and technically feasible and therefore that its request should be denied.

155. Metriplex, Inc., PP-81, is another proponent of acknowledgment paging, but has not demonstrated that the specifics of its technical proposal will work. Metriplex applied for an experimental license only on June 18, 1992, and therefore too late to receive a license and obtain results prior to this Tentative Decision. Accordingly, we tentatively conclude that Metriplex has failed to meet its burden of demonstrating that its proposal is new, innovative, and technically feasible and therefore that its request should be denied.

156. Skycell Corporation, PP-85, proposes to use 900 MHz channels for control applications of CT-2 Telepoint payphone services. Skycell fails to discuss the technical feasibility and demand for such services, and even more particularly, why these functionalities should be provided over scarce frequencies and 900

¹¹⁷Request for Pioneer's Preference at 5, 8.

MHz in particular. Accordingly, we tentatively conclude that Skycell's request should be denied.

157. Montauk Telecommunications Company, PP-83, proposes to broadcast information to facsimile machines. However, as of the date of adoption of this Notice there is nothing in the record to indicate that Montauk has tested over the air the technical feasibility of its system. Montauk also has not addressed why scarce spectrum in the 900 MHz range, rather than wireline or other frequencies, should be used for a fixed service. Accordingly, we tentatively conclude that Montauk's request should be denied.

158. Mobile Communications Corporation of America, PP-82, proposes to offer a variety of services that are indistinguishable from those proposed by other requesters. Mobile's request and experimental application do not demonstrate that it has developed the capabilities or possibilities of a specific identifiable PCS technology or service. While Mobile proposes to develop a multi-phase modulation technique to increase spectrum efficiency, it has yet to demonstrate its feasibility through an experiment. Accordingly, we tentatively conclude that Mobile's request should be denied.

159. PacTel Paging, PP-39, proposes ground-to-air paging to provide paging service to passengers on aircraft. We conclude that this proposal is not innovative because the technology already exists and other entities already provide communications between ground and aircraft. We do not believe that delivering a paging message to a specific aircraft is sufficiently innovative to warrant grant of a preference, and accordingly tentatively conclude that this request should be denied.

160. Dial Page, L.P., PP-35, proposes a system by which the unit consumers use to receive a page would acknowledge receipt. Dial Page states that its technology also may be used for other automatic data applications, such as automatic meter reading, telemetry and control, and credit card verification. However, others in this proceeding also have proposed schemes for providing acknowledgment of paging messages, and Dial Page has not demonstrated the technical feasibility of its system through an over-the-air test. Accordingly, we tentatively conclude that this request should be denied.

161. Echo Group, L.P., PP-36, proposes a two-way mobile data radio service. Echo submits that the technical feasibility of its proposal will be proven through its experiments, but has not filed with us any reports on the results of its experiments. Accordingly, we tentatively conclude that this request should be denied.

162. PacTel Paging, PP-38, proposes a broadly-defined "advanced architecture paging" to provide a wide array of one-way paging services, including digitized voice messaging, alphanumeric messages, E-mail, video, facsimile, and graphics. PacTel's experimental report indicates that it is testing bit rates for simulcast systems, but testing and results have not concluded. There is no evidence that PacTel has developed a methodology that equals or exceeds the information transmission capacity developed by Mtel. Accordingly, we tentatively conclude that this request should be denied.

163. Finally, Global Enhanced Messaging Venture, PP-80, also proposes to provide a wide variety of data and paging services using a claimed new technology capable of transmitting at a rate in excess of 6,000 bps. We note that even if Global had demonstrated the feasibility of its proposal through an experiment, Mtel's technology is capable of transmitting at greater than 20,000 bits-per-second. Accordingly, we tentatively conclude that this request should be denied.

V. CONCLUSION

164. In view of the increasing activity in development of innovative personal communication systems using advanced technologies and the potential benefits of these enhanced services offer for the public, we find that it is now appropriate to consider providing an allocation in both the 900 MHz and 2 GHz portions of spectrum for these services. To facilitate the development and implementation of these services as quickly as possible we are proposing a flexible regulatory approach with as few restrictions as possible. The proposed changes to the Rules are listed in the Appendix A. We seek comment on our proposals and any additional information that will facilitate the development of PCS services.

VI. INITIAL REGULATORY FLEXIBILITY ANALYSIS

165. Pursuant to the Regulatory Flexibility Act of 1980, the Commission finds as follows:

A. Reason for Action

This rule making proceeding is initiated to obtain comment regarding the implementation of PCS in the 901-902, 930-931, 940-941, 1850-1895, and 1910-1975 MHz bands.

B. Objective

The objective of this proposal is to provide adequate spectrum and service rules in a reasonable time frame for the

development and implementation of new innovative PCS services to the American public.

C. Legal Basis

The proposed action is authorized by Sections 4(i), 303(c), 303(f), 303(g), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154(i), 303(c), 303(f), 303(g), and 303(r). These provisions authorize the Commission to make such rules and regulations as may be necessary to encourage more effective use of radio as is in the public interest.

D. Description, Potential Impact, and Number of Small Entities Affected

This proposal may provide new opportunities for radio manufacturers and supplier of radio equipment, some of which may be small businesses, to develop and sell new equipment. Further, it may provide many new telecommunications services that may greatly impact the abilities of small entities to conduct business. Because this proposal concerns allocation of spectrum and licensing of new services, we are unable to quantify other potential effects on small entities. We invite specific comment on this point by interested parties.

E. Reporting, Record Keeping and other Compliance Requirements

None.

F. Federal Rules which Overlap, Duplicate or Conflict with this Rule

None.

G. Significant Alternatives

If promulgated this proposal will provide a spectrum for the development of new innovative PCS technologies in the immediate future. We are unaware of other alternatives which would provide such spectrum flexibility in the immediate future. We solicit comment on this point.

VII. PROCEDURAL INFORMATION

166. The rulemaking proposals in this Notice constitute a non-restricted notice and comment rulemaking proceeding. Ex parte presentations are permitted, except during the Sunshine Agenda period, provided they are disclosed as provided in Commission rules. See generally 47 C.F.R. §§ 1.1202, 1.1203, and 1.1206(a).

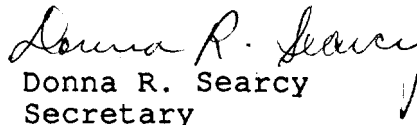
167. The pioneer's preference tentative decisions in this Notice constitute restricted adjudicative proceedings. No ex parte presentations are permitted until final Commission decisions regarding the preference requests are made and are no longer subject to reconsideration by the Commission or review by any court. In addition, no presentation, ex parte or otherwise, is permitted during the Sunshine Agenda period. See generally 47 C.F.R. §§ 1.1202, 1.1203, and 1.1208.

168. This action is taken pursuant to Sections 4(i), 303(c), 303(f), 303(g), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154(i), 303(c), 303(f), 303(g), and 303(r).

169. Pursuant to applicable procedures set forth in Sections 1.415 and 1.419 of the Commission's Rules, interested parties may file comments on or before November 9, 1992, and reply comments on or before December 9, 1992. All relevant and timely comment will be considered by the Commission before final action is taken in this proceeding. To file formally in both proceedings, ET Docket No. 92-100 and GEN Docket No. 90-314, participants must file an original and six copies of all comments, reply comments, and supporting comments. If participants want each Commissioner to receive a personal copy of their comments, an original plus eleven copies must be filed. However, if participants wish to file in only one of the two proceedings, then participants must file an original plus four copies or an original plus nine copies if they want each Commissioner to receive a personal copy. Comment and reply comment should be sent to Office of the Secretary, Federal Communications Commission, Washington, D.C. 20554. Comments and reply comments will be available for public inspection during regular business hours in the Dockets Reference Room (Room 239) of the Federal Communications Commission, 1919 M Street, N.W., Washington, D.C. 20554.

170. For further information concerning this rule making contact Mr. Fred Lee Thomas at (202) 653-6204, Office of Engineering and Technology, Federal Communications Commission, Washington, D.C. 20554.

FEDERAL COMMUNICATIONS COMMISSION


Donna R. Searcy
Secretary

APPENDIX A: PROPOSED RULES

I. Part 2 of Chapter I of Title 47 of the Code of Federal Regulations is proposed to be amended as follows:

PART 2 -- FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

1. The authority citation in Part 2 continues to read:

AUTHORITY: Sec. 4, 302, 303, and 307 of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154, 154(i), 302, 303, 303(r) and 307, unless otherwise noted.

2. Section 2.106, the Table of Frequency Allocations is proposed to be amended as follows:

Section 2.106 Table of Frequency Allocations.

United States table		FCC use designators	
Non-Government			
Allocation MHz		Rule part (s)	Special-use frequencies
(5)		(6)	(7)

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901-902 FIXED. MOBILE. US116 US268	PERSONAL COMMUNICATIONS SERVICES (99).
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929-930 LAND MOBILE. US116 US215 US268	DOMESTIC PUBLIC LAND MOBILE (22). PRIVATE LAND MOBILE (90).	
930-931 FIXED. MOBILE. US116 US215 US268	PERSONAL COMMUNICATIONS SERVICES (99).	
931-932 LAND MOBILE. US116 US215 US268	DOMESTIC PUBLIC LAND MOBILE (22). PRIVATE LAND MOBILE (90).	

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940-941 FIXED. MOBILE. US116 US268	PERSONAL COMMUNICATIONS SERVICES (99).	
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1850-1990 FIXED. MOBILE.	PERSONAL COMMUNICATIONS SERVICES (99). PRIVATE OPERATIONAL- FIXED MICROWAVE (94). RADIO FREQUENCY DEVICES (15).	
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II. Title 47 of the Code of Federal Regulations, Part 15, is proposed to be amended to read as follows:

1. The authority citation continues to read as follows:

Authority: Sec. 4, 302, 303, 304, and 307 of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154, 302, 303, 304 and 307.

2. Section 15.5 is amended by adding new paragraph (e) to read as follows:

Section 15.5 General Conditions of Operation

* * * * *

(e) Operations in the band 1910 - 1930 MHz under Section 15.253 of this Part are not required to protect Part 94 operations for which a license application is filed after July 16, 1992.

3. Section 15.35 is amended by revising the first sentence in paragraph (b) to read as follows:

Section 15.35 Measurement detector functions and bandwidth.

* * * * *

(b) Unless otherwise specified, the radiated limits for frequencies above 1000 MHz are based on the use of measurement instrumentation employing an average detector function. * * *

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4. Section 15.215 is amended by revising paragraph (a) to read as follows:

Section 15.215 Additional provisions to the general radiated emission limitations.

(a) The regulations in Sections 15.217-15.253 provide alternatives to the general radiated emission limits for intentional radiators operating in specified frequency bands. Unless otherwise stated, there are no restrictions as to the types of operation permitted under these sections.

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5. A new Section 15.253 is added to read as follows:

Section 15.253 Operation within the band 1910-1930 MHz.

(a) Operation under the provisions of this section is limited to systems used for the following purposes:

(1) Cordless telephones, including wireless PBX systems. Intercom and paging operations are permitted between portable, base and mobile stations without using the public switched telephone network provided these are not intended to be the primary modes of operation.

(2) Data communications between computer systems.

(b) Channelization and emission limits:

(1) Operation in the band 1910-1920 MHz:

(i) The total peak output power of the intentional radiator over the band 1910-1920 MHz shall not exceed 1 watt.

(ii) Emissions outside the band 1910-1920 MHz shall be attenuated at least 50 dB below the maximum level of the fundamental emission, based on testing with the fundamental emission located as close as possible to the edge of the 1910-1920 MHz band, as limited by the design of the intentional radiator frequency control.

(iii) The minimum 6 dB bandwidth under any condition of input or modulation shall be at least 2 MHz.

(iv) Under any condition of operation, the power density shall not be greater than 1.5 mW, peak power, in any 3 kHz bandwidth during any one second interval.

(2) Operation in the band 1920-1925 MHz:

(i) Operation shall be centered, as adjusted by the frequency tolerance, in one of 50 channels, 100 kHz in width, starting with 1920.0-1920.1 MHz and ending with 1924.9-1925.0 MHz.

(ii) The peak output power of the intentional radiator shall not exceed 20 mW.

(iii) Emissions outside the 100 kHz channel shall be attenuated at least 33 dB below the maximum level of the fundamental emission.

(3) Operation in the band 1925-1930 MHz:

(i) Operation shall be centered, as adjusted by the frequency tolerance, in one of 4 channels, 1.25 MHz in width, starting with 1925.0-1926.25 MHz and ending with 1928.75-1930.0 MHz.

(ii) The peak output power of the intentional radiator shall not exceed 100 mW.

(iii) The minimum 6 dB bandwidth under any condition of modulation shall be at least 250 kHz.

(iv) Emissions outside the 1.25 MHz channel shall be attenuated at least 40 dB below the maximum level of the fundamental emission.

(4) All power levels specified above are expressed in terms of the maximum peak power when measured with instrumentation calibrated in terms of an rms-equivalent voltage and are based on the use of an antenna with a gain no greater than 3 dBi.

(i) The output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 3 dBi.

(ii) The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement for the fundamental emission over the full bandwidth of the authorized channel.

(5) On any frequency or frequencies above 1000 MHz, except as noted below, compliance with the emission limits are based on the use of measurement instrumentation employing a peak detector function and a 1 MHz minimum resolution bandwidth, except as noted below. Wider bandwidths may be used.

(i) For intentional radiators operating in the band 1920-1925 MHz, the emission limits within the band of operation are based on the use of measurement instrumentation employing a peak detector function and a 10 kHz resolution bandwidth.

(ii) For intentional radiators operating in the band 1925-1930 MHz, the emission limits within the band of operation are based on the use of measurement instrumentation employing a peak detector function and a 100 kHz resolution bandwidth.

(iii) Where it can be shown that, because of the particular technology employed in the intentional radiator, the above criteria in this paragraph should be modified, it is

permissible to do so provided prior Commission approval is obtained.

(iv) Compliance with the provisions of Section 15.205 shall be demonstrated using the measurement instrumentation specified in that section.

(6) Radiated emissions below 1000 MHz that result from digital circuitry associated with the intentional radiator, including digital circuitry that enables or controls the operation of the intentional radiator, shall not exceed the limits in this part for a digital device.

(7) If the emissions from the intentional radiator causes harmful interference to authorized radio services operating under another rule part, the Commission may require appropriate technical changes in the equipment to alleviate the interference, including additional reductions in emissions below the limits specified in this part.

(c) The frequency stability of the intentional radiator shall be maintained within ± 0.0001 percent of the center frequency over a temperature variation of -30 degrees to +50 degrees C at normal supply voltage, and over a variation in the primary supply voltage of 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

(1) For battery operated equipment, the equipment tests shall be performed using a new battery without any further requirement to vary supply voltage.

(2) It is acceptable for an intentional radiator to cease functioning outside of a narrower temperature range as long as it complies with the frequency stability requirements within the temperature range over which it operates.

(d) Spectral efficiency requirements:

(1) Except for systems operating within the band 1910-1920 MHz, before transmission can occur the associated receiver must automatically monitor the spectrum to be used and prevent operation of the intentional radiator if another transmission is detected within the desired band of operation.

(2) Analog modulation shall not be employed. All transmissions are limited to the use of digital modulation techniques.

(3) The spectral efficiency is equal to (data rate in bits/second) divided by (power in watts x the channel bandwidth in Hz). This calculated value shall not be less than 10.

(4) Intentional radiators shall be equipped with adaptive power control systems that sense when less transmission power could be employed and automatically lower the output level of the intentional radiator by at least one step of 10 dB or more.

III. Part 22 of Chapter I of Title 47 of the Code of Federal Regulations is proposed to be amended as follows:

PART 22 -- PUBLIC MOBILE SERVICE

1. The authority citation in Part 22 continues to read:

AUTHORITY: 47 U.S.C. Sections 154, 303, unless otherwise noted.

2. Section 22.930 is amended by revising the headnote and introductory text and by removing and reserving paragraphs (b), (f) and (g).

Section 22.930 Alternative technologies and auxiliary services.

Cellular system licensees may employ alternative cellular technologies and may provide auxiliary common carrier services including personal communications services (as defined in § 99.3 of Part 99 this chapter, except for the frequency ranges specified therein) on their assigned cellular spectrum (other than that designated for cellular control channels), provided that interference to other cellular systems is not caused, and service to roamers whose mobile equipment conforms to OST 53 is provided. The only fixed service permitted under this section is basic exchange telecommunications radio service. The provisions of this section are referred to as the cellular service option.

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(b) [Reserved]

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(f) [Reserved]

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(g) [Reserved]

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IV. A new Part 99 of Chapter I of Title 47 of the Code of Federal Regulations is proposed as follows:

PART 99 -- PERSONAL COMMUNICATIONS SERVICES

1. The authority citation in Part 99 is proposed to read:

AUTHORITY: Secs. 4, 303, 48 Stat. 1066, 1082, as amended; 47 U.S.C. Sections 154, 303, and 332, unless otherwise noted.

2. Part 99 is proposed as follows:

Subpart A - General Information

§ 99.1 Basis and purpose.

This section contains the statutory basis for this part of the rules and provides the purpose for which this part is issued.

(a) Basis. The rules for the personal communications services (PCS) in this part are promulgated under the provisions of the Communications Act of 1934, as amended, which vests authority in the Federal Communications Commission to regulate radio transmission and to issue licenses for radio stations. The rules in this part are in accordance with applicable statutes, international treaties and agreements to which the United States is a party.

(b) Purpose. This part states the conditions under which radio may be licensed and used to provide personal communications services in the frequency bands specified in Subpart C of this part.

§ 99.3 Permissible communications.

PCS licensees may provide any mobile communications service on their assigned spectrum. Fixed services may be provided only on an ancillary basis to mobile operations.

§ 99.5 Definitions.

Average Terrain. The average elevation of terrain between 3.2 and 16 kilometers from the antenna site.

Effective Radiated Power (ERP). The product of the power supplied to an antenna and the gain of the antenna relative to a half-wave dipole in a given direction.

Equivalent Isotropic Radiated Power (EIRP). The product of the power supplied to an antenna and the antenna gain in a given direction relative to an isotropic antenna.